Snow's portrait of science in politics

Charles Percy Snow ignited controversy around science and policy-making in a series of lectures at Harvard University a year after his 'Two Cultures' debate. Below we reproduce an extract from the resulting book, *Science and Government*. It gives a remarkable insight into how science feeds into political decision-making.

Snow was one of Britain's leading science civil servants. He capitalized on his experience at the heart of the government machinery to analyse the role of science and scientists in the United Kingdom during the Second World War. He wanted to disentangle how political decisions were made during the war and, importantly, how scientific advice was used to make them.

In the extract, Snow gives a colourful account of the decision to invest in the development of radar — an unproven technology in the mid-1930s that would prove to be key to the success of the allied war effort.

In the years leading up to the war, the British government did not know how to handle the rise of Adolf Hitler and his military build-up in Germany. Snow homes in on two men, both scientists. One is the chemist Henry Tizard — rector of Imperial College, London, and chairman of an influential committee that advised the Labour government to invest in radar technology. The other is Tizard's one-time friend and later rival, Frederick Lindemann, a close adviser to Winston Churchill, who was then part of the Conservative opposition.

Such an account could have been dry and factual, but this is not what we get from Snow's pen. Instead, his readers are treated to a page-turner. Snow the novelist is not afraid to tell us what his characters might be thinking. He is indiscreet about their personal lives, social connections and professional backgrounds. He guesses their motives and provides his own verdict on their judgements.

Snow was attacked for not being detached enough in his analysis. Yet the book's accessibility ensured it was widely read. Five decades later, *Science and Government* remains a rare inside view of the relationship between science and political authority. **Joanne Baker**

Extract from
Science and Government
by C. P. Snow
Harvard University Press: 1961.

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Frederick Lindemann (right) vehemently disagreed with Henry Tizard (left) over the development of radar as Britain's method of air defence.

In 1934 both Tizard and Lindemann were nearly fifty. Of the two, Tizard had been by a long way the more successful, though even he, judged by the standard he set himself, had not lived up to his promise. He was a trusted man of affairs, he had been knighted, he was head of a university institution, but in his own eyes he had not done much.

As for Lindemann, he had done much less. The professional physicists did not take him seriously as a scientist, and dismissed him as a cranky society pet. Scientifically his name was worth little. He was the intimate friend of [Churchill] a politician whose name was scarcely worth as much.

Then, quite suddenly, Tizard was given the chance for which he was made. England was strategically in a desperately vulnerable position, for reasons — the tiny size of the country, the density of the population — which apply more harshly today. In 1934 [Stanley] Baldwin was the main figure in the government, and it was only two years since he had said lugubriously: "The bomber will always get through."

In public, rebellious politicians like Churchill were attacking the whole of the government's defence policy. In secret, the government scientists, the military staffs, the high officials, were beating round for some sort of defence. There was nothing accidental about this. It was predictable that England, more vulnerable to air attack than any major country, would spend more effort trying to keep bombers off. But there was something accidental and unpredictable in Tizard being given his head.

The Air Ministry, under the influence of their scientific adviser, H. E. Wimperis, himself prodded by a bright young government scientist called A. P. Rowe,[1] set up a Committee for the Scientific Study of Air Defence. Its terms of reference were as flat as usual: "To consider how far advances in scientific and technical knowledge can be used to strengthen the present methods of defence against hostile aircraft." The committee was nothing very important to start with. No one took much notice when its membership was announced. There may have been slight curiosity about the appointment, which was entirely due to Wimperis,[2] of Tizard as chairman. The appointment would not and could not have happened, though, if Tizard had not been so well connected in official life.

Well, that committee was called the Tizard Committee almost from its first meeting. It is slightly touching that in his diary Tizard, who could not use that title, never seems to have been quite certain what its official title really was.

From the first meeting on January 28th, 1935 he gripped the problems. This was the job for which he was born. Quite soon, by the summer of that year, small ripples of confidence oozed under the secret doors and penetrated Whitehall, almost the only ripples of confidence that touched the official world during those years. Tizard insisted on a very small committee which he chose himself. Wimperis had to be there, Rowe was brought in as secretary, but at the beginning there were only two members of independent standing, A. V. Hill and P. M. S. Blackett. Both of these were eminent scientists, of a quite different order of accomplishment from Tizard or Lindemann. Hill was one of the most distinguished physiologists in the world and had won a Nobel prize in 1922. Blackett, who was only thirty-seven at this time, was one of [Ernest] Rutherford's

most brilliant pupils, and later himself won a Nobel prize.[3] …

The committee made up its mind about [radar] before the device really existed. Watson Watt, who was the pioneer of radar in England, … , had done some preliminary experiments. This device might, not certainly but possibly, work in real war in three or four years. Nothing else possibly could. Tizard, Hill, Blackett had faith in their own reasoning. Without fuss, and without backward glances, the choice was made. That was only a resolution on paper, and they had to make it actual.

The administrative mechanism by which this was done is itself interesting. In form the Air Minister, Lord Swinton,[4] arranged for a new high-level committee …. Over this new body he himself presided, and on to it was brought the government's chief military critic, Winston Churchill. In fact, however, one has got to imagine a great deal of that apparently casual to-ing and fro-ing by which high English business gets done. As soon as the Tizard committee thought there was something in radar, one can take it that Tizard would lunch with Hankey[5] at the Athenaeum; Hankey, the secretary of the Cabinet, would find it convenient to have a cup of tea with Swinton and Baldwin. If the Establishment had not trusted Tizard as one of their own, there might have been a waste of months or years. In fact, everything went through with the smoothness, the lack of friction, and the effortless speed which can only happen in England when the Establishment is behind one. Within a very short time the Tizard Committee were asking for millions of pounds, and getting it without a blink of an eye. Two successive secretaries of the Cabinet, Hankey and Bridges,[6] did much more than their official duties in pushing the project through.

The second active job was, in particular, to persuade the serving officers of the Air Staff that radar was their one hope and, in general, to make scientists and military people understand each other. Here again this might have been impossible. In fact, with the exception of those concerned with bombing policy, the senior officers were ready to be convinced as soon as Tizard started to talk.[7] They often thought of putting him in uniform: but that would have defeated his whole virtue as an interpreter between the two sides. "I utterly refuse to wear a busby," he used to say. Fairly soon he had not only got radar stations in principle accepted and hoped for, but also succeeded, with the help of Blackett's exceptional drive and insight, in beginning to teach one lesson each to the scientists and the military, lessons that Tizard and Blackett went on teaching for twenty years.

ILLUSTRATION BY SUZANNE BARRETT

The lesson to the military was that you cannot run wars on gusts of emotion. You have to think scientifically about your own operations. This was the start of operational research,[8] the development of which was Blackett's major personal feat in the 1939–45 war.[9] The lesson to the scientists was that the prerequisite of sound military advice is that the giver must convince himself that, if he were responsible for action, he would himself act so. It is a difficult lesson to learn. If it were learnt, the number of theoretical treatises on the future of war would be drastically reduced.

The committee met for the first time, as I said, in January 1935. By the end of 1935 its important decisions were in effect taken. By the end of 1936 most of those decisions were translated into action. It was one of the most effective small committees in history. But before it clinched its choices, there was a most picturesque row.

The committee had been set up, as we saw, from inside the Air Ministry. One of the reasons was, no doubt, to forestall criticism from outside, which came most loudly and effectively from Churchill. In 1934 he had publicly challenged the government's underestimate of the size of Hitler's air force. His figures, which had been produced by Lindemann, were much nearer the truth than the government's. Thus, simultaneously, there were going on the secret deliberations and discussions of the Tizard Committee, and an acrimonious military argument in full light in the House of Commons and the press, with Churchill the antigovernment spokesman.

It is one of the classical cases of "closed" politics coexisting with "open" politics. Passing from one to the other, an observer would not have known that he was dealing with the same set of facts. By the middle of 1935 Baldwin, who had just in form as well as fact become Prime Minister, wanted to reduce the temperature of the "open" military argument. He used the orthodox manoeuvre of asking Churchill in. Not into the Cabinet: the personal rifts were too deep for that, but onto the new Swinton Committee, [a] *political* committee …, which was to keep a supervisory eye on air defence.

The history is very tangled at this point. No minutes have ever been published, but if I know Hankey and his colleagues at all — and I had the good luck to work under them a short time later — I have not much doubt that on the one hand they felt confident that they could give the Tizard Committee its head (Tizard sat himself on the political committee and made his requests for money to it), and that on the other hand it could not do harm, and might do good, if Churchill were given exact information of what was actually being done, rather than inexact.

Roughly that was what happened, but there were other consequences. Churchill entered the political committee, retaining the right to criticise in public and insisting that Lindemann, as his personal scientific adviser, be given a place on the Tizard Committee. Both

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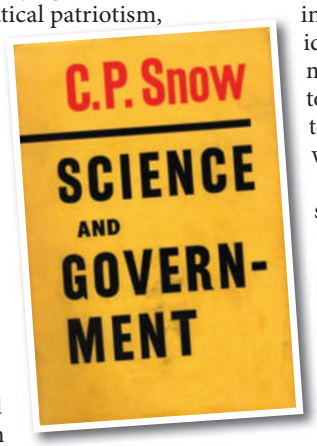
"But the trouble is when you get on to any kind of moral escalator, to know whether you're ever going to be able to get off." — C. P. Snow (1961).

these conditions were reasonable enough: but then the private war began.

Almost from the moment that Lindemann took his seat in the committee room, the meetings did not know half an hour's harmony or work undisturbed. I must say, as one with a taste for certain aspects of human behaviour, I should have dearly liked to be there. The faces themselves would have been a nice picture. Lindemann, Hill, and Blackett were all very tall men of distinguished physical presence — Blackett sculptured and handsome, Hill ruddy and English, Lindemann pallid, heavy, Central European. Blackett and Hill would be dressed casually, like academics. Tizard and Lindemann, who were both conventional in such things, would be wearing black coats and striped trousers, and both would come to the meetings in bowler hats. At the table Blackett and Hill, neither of them especially patient men nor overfond of listening to nonsense, sat with incredulity through diatribes by Lindemann, scornful, contemptuous, barely audible, directed against any decision that Tizard had made, was making, or ever would make. Tizard sat it out for some time. He could be irritable, but he had great resources of temperament, and he knew that this was too serious a time to let the irritability flash. He also knew, from the first speech that Lindemann made in committee, that the friendship of years was smashed.

There must have been hidden resentments and rancours, which we are now never likely to know and which had been latent long before this. No doubt Lindemann, who was a passionate man, with the canalised passion of the repressed, felt that he ought to have been doing Tizard's job. No doubt he felt, because no one ever had more absolute belief in his own conclusions, that he would have done Tizard's job much better, and that his specifics for air defence were the right ones, and the only right ones. No doubt he felt, with his fanatical patriotism, that Tizard and his accomplices, these Blacketts, these Hills, were a menace to the country and ought to be swept away.



The racy style of Snow's book meant it was widely read.

It may have been — there are some who were close to these events who have told me so — that all his judgments at these meetings were due to his hatred of Tizard, which had burst out as uncontrollably as love. That is, whatever Tizard wanted and supported, Lindemann would have felt unshakably was certain to be wrong and would have opposed. The other view is that Lindemann's scientific, as well as his emotional, temperament came in: it was not only hatred for Tizard, it was also his habit of getting self-blindingly attached to his own gadgety ideas that led him on. Whatever the motive was, he kept making his case to the committee in his own characteristic tone of grinding certainty. It was an unjustifiable case.

The issue in principle was very simple. Radar was not yet proved to work: but Tizard and the others, as I have said, were certain that it was the only hope. None of them was committed to any special gadget. That was not the cast of their minds. There was only a limited amount of time, of people, of resources. Therefore the first priority must be given to radar — not only to making the equipment, but to making arrangements, well in advance even of the first tests, for its operational use. (It was in fact in the operational use of radar, rather than in the equipment, that England got a slight tactical lead.)

Lindemann would not have any of this. Radar was not proved. He demanded that it should be put much lower on the priority list and research on other devices given the highest priority. He had two pet devices of his own. One was the use of infra-red detection. This seemed wildly impracticable then, to any of the others and to anyone who heard the idea. It seems even more wildly impracticable now. The other putative device was the dropping, in front of hostile aircraft, of parachute bombs and parachute mines. Mines in various forms had a singular fascination for Lindemann.

For twelve months Lindemann ground on with his feud on the committee. He was tireless. He was ready at each meeting to begin again from the beginning. He was quite

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C. P. Snow championed openness but recognized that radar would not have been developed without 'closed' decision-making.

unsoftened, quite impregnable to doubt. Only a very unusual man, and one of abnormal emotional resistance and energy, could sit with men so able and not be affected in the slightest regard.

They themselves were not affected so far as choice was concerned. Tizard went ahead with the radar decisions and let Lindemann register his disagreement. But gradually they got worn down. Neither Blackett nor Hill was phlegmatic enough to endure this monomaniac tension for ever. In July 1936,[10] when the committee were preparing a report, Lindemann abused Tizard in his usual form, over the invariable issue of too much priority for radar, but in terms so savage that the secretaries had to be sent out of the room.[11]

At that point Blackett and Hill had had enough of it. They resigned and did not try to give an emollient excuse for doing so. Whether this was done after discussion with Tizard is not clear. No discussion was really necessary. They all believed that this friction was doing too much harm. They were all experienced enough to know that, with Churchill still out of office, they could make their own terms.

Within a short time the committee was reappointed. Tizard was still chairman, Blackett and Hill were still members. Lindemann, however, was not. He was replaced by E. V. Appleton, the greatest living English expert on the propagation of radio waves. Radar itself was an application of Appleton's fundamental work. The announcement of his name meant, in the taciturn eloquence of official statements, a clear victory for radar and for Tizard. The radar stations and the radar organisation were ready, not perfect but working, in time for the Battle of Britain. This had a major, and a perhaps decisive, effect.

This cautionary story of the first Lindemann–Tizard collision seems to me to contain a number of lessons, some of them not obvious. But there is one, at the same time so obvious and so ironic that I shall mention it now. It is simply that the results of closed politics can run precisely contrary to the results of open politics. That is an occupational feature of the way in which closed politics works and the way in which secret choices are made. Probably not more than a hundred people had any information whatever about Tizard's first radar decision; not more than twenty people took any effective part in it, and at the point of choice not more than five or six.

While that was going on, so also was violent open politics, the open politics of the thirties, the most ferocious and deeply felt open politics of my lifetime. Nearly everyone I knew of my own age who was politically committed, that is, who had decided that fascism had at all costs to be stopped, wanted Churchill brought into government. Partly for his own gifts, partly as a symbol of a country which was not going to let the Nazis win by default. We signed collective letters about Churchill; we used what influence we had, which in those years was not much. We wanted a government which would resist, the kind of government we finally got in 1940. That was the position, I think, of Blackett and most of my liberal friends. It was certainly my own. Looking back, I think we were right, and if put back in those years again I should do what I did then.

The ifs of history are not very profitable — but if Churchill had been brought back to office, if open politics had gone the way my friends and I clamoured and implored that it should? We should, without any question, have been morally better prepared for war when it came. We should have been better prepared in the amount of war material. But, studying the story I have just told, I find it hard to resist the possibility that, in some essential technical respects, we might have been worse prepared. If Churchill had come into office, Lindemann would have come with him, as happened later. It is then very hard to imagine Lindemann not getting charge of the Tizard Committee. As I have said, I take a pretty Tolstoyan view of history in the large. In a broad sense I cannot easily accept that these small personal accidents could affect major destinies.

And yet … without getting the radar in time we should not have stood a good chance in the war that finally arrived. With Lindemann instead of Tizard, it seems at least likely that different technical choices would have been made. If that had been so, I still cannot for the life of me see how the radar system would have been ready in time.

These retrospective fears are not profitable. But I do not know of a clearer case where open and closed politics appear to tell such different stories and point to such different fates. ■

Endnotes

[1]Rowe played an important part, easy to underestimate because the whole of it was secret, in the scientific war, 1935–45. He is best known as the superintendent of the Telecommunication Research Establishment, the most brilliant and successful of the English wartime research establishments.

[2]It is worth noticing that Wimperis, who was a peace-loving, sweet-natured man, ill-at-ease among violent disputes, both got the committee going and selected Tizard.

[3]In 1948.

[4]Lord Swinton's part in these preparations, like Rowe's, though for different reasons, has been constantly underestimated.

[5]At this time Sir Maurice, later Lord, Hankey. One of the great invisible influences in English affairs, particularly military affairs, for a generation. His part has not yet been properly described.

[6]Later head of the Civil Service and now Lord Bridges.

[7]Cf. P. M. S. Blackett, "Tizard and the Science of War," *Nature* **185,** 647–653 (1960).

[8]"Operations research" in the United States. But the English started it, and I much prefer the English name. In the 1914–18 war, A. V. Hill's scientists were testing anti-aircraft gunnery and were carrying out what we should later have called operational research.

[9]P. M. S. Blackett, "Operational Research," *Brassey's Annual* (1953) 88–106.

[10]Not 1937 as stated in [W. S.] Churchill [*The Second World War* Vol. 1 (Cassell, 1948)], p. 120. There are other inaccuracies in the chapter ("Problems of Sea and Air, 1935–1939," pp. 115–128).

[11]This is Blackett's account. Rowe is inclined to think, without being certain, that this critical quarrel took place before a meeting. It may easily have happened that, since a row was expected, the secretaries were told not to come in at the beginning.

See Editorial, page 10.